



# Medtronic

## Integrated Power Console (IPC™)

Models EC300 and 1898001



Service Manual for Console and Attachments

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Rx Only

### **Notice**

**This manual is provided primarily for information purposes. Although there are certain troubleshooting actions that may be attempted by the customers as specifically listed in this manual, all repairs must be undertaken by Medtronic Xomed or its authorized representative.**

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The information contained in this document was accurate at time of publication. Medtronic reserves the right to make changes in the product described in this manual without notice and without incorporating those changes in any products already sold.

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# Symbols

<b>SN</b>	Serial Number
	Do not dispose of this product in the unsorted municipal waste stream. Dispose of this product according to local regulations. See <a href="http://recycling.Medtronic.Com">http://recycling.Medtronic.Com</a> for instructions on proper disposal of this product.
	Do not use if package is open or damaged
	Package Contents
<b>1</b>	Pump Head 1
<b>2</b>	Pump Head 2
	Use by Date
	Do not Reuse
<b>LOT</b>	Lot Number
	Fuse
<b>ACC</b>	Accessory
<b>REF</b>	Catalog Number
<b>REF</b>	
	AC power
	Output
	Is approximately equal to
<b>STERILE R</b>	Sterilized by radiation. Do not use if package is open or damaged
<b>STERILE</b>	Non sterile
<b>STERILE EO</b>	Sterilized by ethylene oxide. Do not use if package is open or damaged
<b>EC REP</b>	Authorized representative in the european community
	This device complies with medical device directive 93/42/EEC
<b>Rx Only</b>	Caution: federal law (U.S.A.) Restricts this device to sale by or on the order of a physician
<b>! USA</b>	USA Only
	Quantity

	Manufacturer
	Date of Manufacture
	ROHS - Environmental friendly use period - China (SJ/T11364-2006.)
	Not greater than 120VAC
	Applied part duty cycle
	Recommended storage temperature and limits.
	Conforms to ANSI/AAMI ES 60601-1, IEC/EN 60601-1. Certified to CSA C22.2 No.601.1
	Handpiece
	Skeeter® handpiece
	EMC compliance mark
	Protective Earth
	Equipotential
	Consult instructions for use
	Attention see instructions for use
<b>IPX1</b>	Protected against vertical water drops
<b>IPX7</b>	Protected against the effects of temporary immersion in water
	Type BF applied part
	Manual Start/Stop
	RF transmitter (interference may occur)
	Precaution: Pinch hazard. Keep fingers clear of rollers
<b>BUR</b>	STIM BUR connector
<b>NIM</b>	NIM® console connector
<b>EHS</b>	Electrical high speed handpiece connector
	Foot pedal connector
<b>Fr</b>	World Wide Standard for medical tubing diameter.
	Fine irrigant adjustment

	Left foot control unit button
	Right foot control unit button
	Top foot control unit button
	Locked
	Unlocked
	On/Off (main power)
	Use with
<b>Instrument Case</b>	Instrument case
<b>Lubricant/Diffuser</b>	Lubricant/Diffuser
<b>Dissecting Tool</b>	Dissecting Tool
<b>Attachment</b>	Attachment
<b>Control Unit</b>	Control Unit
<b>Refurbished</b>	Refurbished
<b>Accessory</b>	Accessory
<b>Regulator</b>	Regulator
<b>Bone Mill</b>	Bone Mill
<b>Motor</b>	Motor
<b>Brush</b>	Brush
<b>Adapter</b>	Adapter
<b>TOOL</b>	Tool control
<b>TUBE</b>	Tube control
<b>Multi-Use Disposable Attachment</b>	Multi-Use Disposable Attachment

## NOTE

**IT IS IMPORTANT THAT THE OPERATOR BE FAMILIAR WITH THIS MANUAL AND THE USER'S GUIDE WITH THEIR WARNINGS, PRECAUTIONS, PROCEDURES AND SAFETY ISSUES.**

## General

Uppercase Alphabetic list (A. B. C. etc.) contain introductory information where Numeric list (1. 2. 3. etc.) are “How To” instructions.

## Definitions

Explaining the essential meaning of a word or acronym as used in this manual.  
Also explains changes in words or phrases variations from one product generation to the next.

FCU –	Foot Control Unit
IPC™ -	Integrated Power Console
I.V. -	Intravenous
NIM® -	Nerve Integrity Monitor - One or all of the following units: NIM-Response®, NIM-Pulse®, NIM-Response® 2.0, NIM-Pulse® 2.0, NIM-Neuro® 2.0, NIM-Response® 3.0, NIM-Pulse® 3.0, NIM-Neuro® 3.0
Nomenclature	The act or process or an instance of naming

## Warnings and Precautions

### Warnings

W1	The IPC™ shall only be serviced by trained technicians at an authorized Medtronic service facility
W2	The IPC™ contains live circuitry that can cause injury or death if the enclosure is opened.
W3	The IPC™ contains live circuitry that can cause injury or death to operators or patients if assembled incorrectly. This document and the documents referenced herein are not sufficient to guarantee correct assembly and operation of the device. Product specific training and product specific test equipment is required to ensure the correct operation and assembly of the IPC™.
W4	This system requires insulated connectors for the StraightShot® M4 Microdebrider, StraightShot® Magnum® II Microdebrider, StraightShot® III Microdebrider, Midas Rex® SC1, Visao®, or Skeeter® handpieces and the Multi Function Foot Control Unit.
W5	Auxiliary Power Outlet with protective cover is for use with the HydroDebrider™, or Bone Mill consoles only.
W6	Sterilize and dry reusable device before storing the system. Decrease likelihood of cross-contamination with timely sterilization.
W7	After each procedure, properly clean all reusable system components.
W8	Auxiliary Power Outlet with protective cover is for use with the HydroDebrider™, or Bone Mill consoles only.

### Precaution

P1 Prime/Flush Priming is a feature designed to purge air out of the tubing set(s) during setup. The first time a Prime or Flush button is pressed it will turn on pump 1 and/or 2 long enough to purge air out of the tubing set(s). Turning power Off and On resets the Prime feature. Once pressed all Prime buttons will change to Flush buttons.

## System Description

The IPC™ System is a powered microdebrider, drill and saw system that will remove soft tissue, hard tissue, bone, and biomaterials during surgical procedures. The system consists of a power control console, footswitch, connection cables, and assorted handpieces to drive various burs, blades, drills, rasps, cannulae, and saws. It includes integrated irrigation pumps for irrigation of blades, burs and for motor coolant.

The Nerve Integrity Monitor (NIM®) is a separate device that stimulates and monitors the nerve. This system has connections that allow the NIM® to be connected with the Visao® handpiece and Stimulating Bur Guard enabling the NIM® to stimulate and monitor the nerve at the surgical site.

The system can be used to clear the end of a rigid rod endoscope in order to maintain good visualization of endoscopic procedures without having to remove the scope from the surgical site.

This device is intended for use by physicians trained in the procedures described.

## Sales and Customer Care

Medtronic is committed to provide the highest standard of workmanship in manufacturing its products. Your system requires minimal maintenance and calibration.

Servicing and/or modification to the system, or any accessory/attachment by anyone other than qualified service personnel may significantly compromise the systems performance and void the equipment warranty. For best performance, it is recommended that all service be performed by Medtronic Xomed service personnel.

Medtronic recommends preventative maintenance and screen calibration scheduled at yearly intervals. Comprehensive testing and calibration should be performed by returning the entire system to Medtronic Customer Service.

## U.S. Customers

Should your console or related equipment malfunction, Medtronic provides, at no charge, loaner equipment shipped to your facility by UPS or Federal Express for use while your equipment is being serviced by Medtronic. Please adhere to the following guidelines:

1. When a loaner console is ordered, please reuse the shipping material and carton when you return your console to Medtronic. Insure the unit.
2. When a loaner is not ordered, please package the console as safely as possible and insure.
3. A return goods authorization number is required on repairs. A copy of your purchase order is required. Make certain the purchase order includes the following:
  - Shipping and billing information
  - Purchase order number
  - Contact person
  - Phone number
  - Description of malfunction
  - Your Medtronic account number
4. Please indicate preferred method of return shipment. Otherwise the unit will be shipped back via UPS ground.
5. When the malfunctioning unit is not covered by warranty, Medtronic will contact your facility promptly with a repair cost estimate if requested. The customer will be responsible for freight charges on non-warranted units.
6. When you have loaner equipment and you receive your repaired unit, please package the loaner equipment as safely as possible using the foam provided with your repaired equipment. Include paperwork indicating the unit is a loaner, and Medtronic will credit your account.
7. Loaner equipment not received by Medtronic within 30 days from the date that repaired equipment is shipped will be invoiced at full purchase price.

## Medtronic Xomed, Inc.

6743 Southpoint Drive North  
Jacksonville, FL 32216 USA  
WWW.medtronicENT.com

### U.S. Help Line

(800)-874-5797.

## Medtronic Powered Surgical Solutions

4620 North Beach Street  
Fort Worth, TX 76137 USA  
WWW.medtronic.com

### U.S. Help Line

(800) 468-9710

## International Service

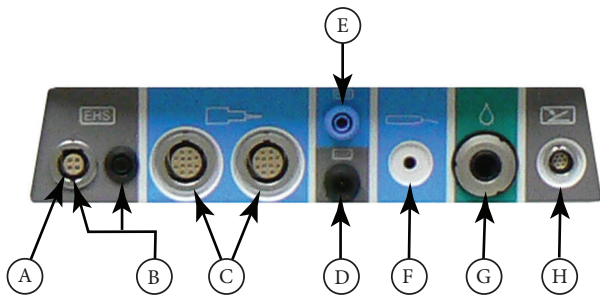
International customers should contact their local Medtronic representative.

# Console Front



- A. Touchscreen – User interface.
- B. Pump 1 – Coolant, lens cleaning, or irrigation.
- C. Pump 2 – Irrigation.
- D. Connector Panel - peripheral devices.
- E. Power Switch – System On/Off switch.

## Connector Panel



Port #	Component	Quantity
A	Midas Rex® Legend EHS® motor	1
B	Midas Rex® Legend EHS® Stylus motor	1
C	StraightShot® M4 Microdebrider	2
	Midas Rex® Legend EHS® Stylus Touch™ motor	
	Midas Rex® SC1	
	StraightShot® Magnum® II and StraightShot® III Visao®	
D	Stimulus input from Patient Interface connection (NIM).	1
E	Stimulus output to STIM Bur Guard	1
F	Skeeter® Handpiece	1
G	Endo-Scrub® 2 Finger Switch	1
	Endo-Scrub® 2 Footpedal	
	IntelliFlow Irrigation Remote Control	
H	Foot Control Unit (FCU)	1

### Connector Panel Cable Connection

- Cable to console connection red/silver dot:
- Red or silver dot connections are multi pin and must be correctly aligned (oriented).
- Cable to console connection without dot:
- Connectors without the red or silver dot are single pin and may be inserted without regard to orientation.

### Connector Panel Cable Disconnection (multi pin)

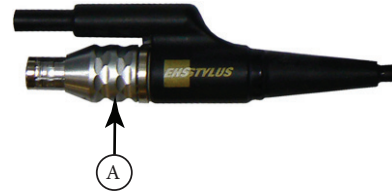
#### To Remove Midas Rex® :

To Remove Midas Rex® Legend EHS® Motor and Legend EHS Stylus® Motor, Cable from motor or console:



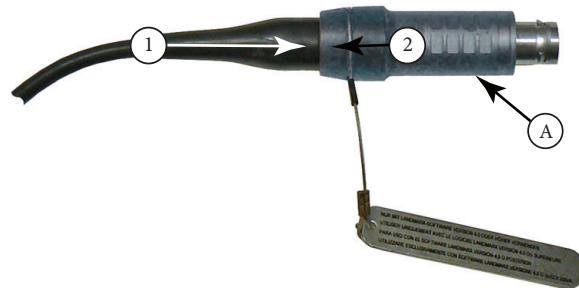
1. Push the cable towards the motor or console.
2. Then pull out by locking ring (A).

#### To Remove Midas Rex® Legend EHS Stylus® Cable from console:



Push the cable towards the console, then pull by locking ring (A)

#### To Remove cables (multi pin) with polymer insulating boots:



*NOTE: Confirm handpieces contain polymer insulating boot (A). If handpiece contain missing or cracked polymer boots, contact Medtronic Customer Care for upgrade.*

*NOTE, If units with polymer insulating boots have debris under the insulator:*

- Reclean according to Cleaning and Sterilization instructions.
- If debris was not removed return for warranty servicing.

See warning W4.

1. Push the cable towards the console.
2. Then pull out by the polymer insulating boot (A).

#### To Remove cables (multi pin) with silicone insulating boots:

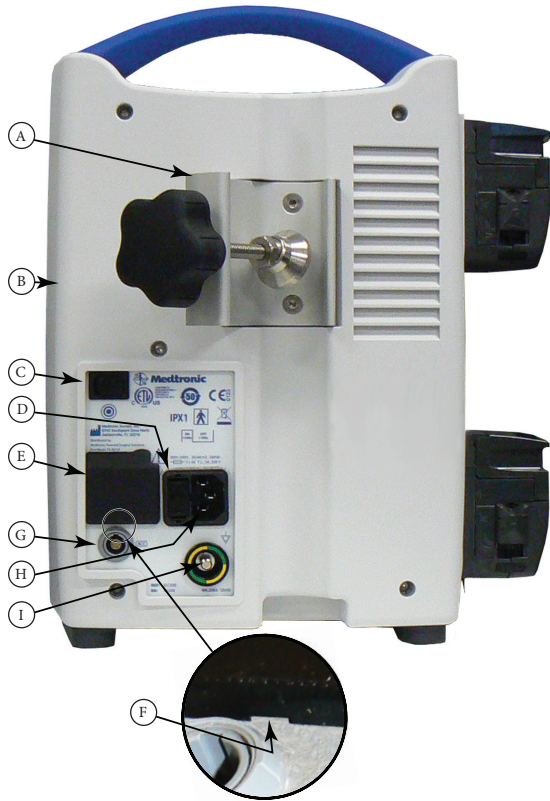


Silicone insulated connectors do not have a locking device (ring) and may be removed by pulling straight out on the connector.

#### Cable Disconnection (single pin)

Single pin connectors do not have a locking device (ring) and may be removed by pulling straight out on the connector.

## Console Rear

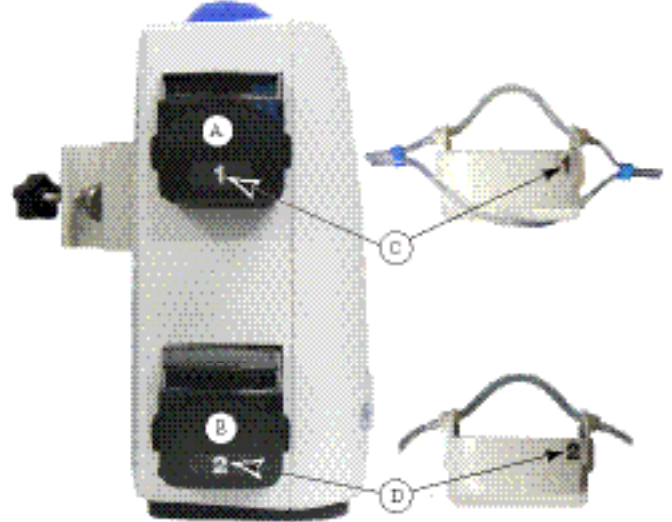


- A. Pole clamp.
- B. Compact flash card port (factory use only).
- C. Manual Start/stop button.
- D. Fuse Access – Replace only with 5 x 20 T. L. 5A, 250 V fuse.
- E. Auxiliary power outlet with protective cover:
  - For use at grid voltage < 120 VAC only.
  - HydroDebrider™, or Bone Mill consoles only. See warning W5.
- F. To remove cover, place small screwdriver in notch at bottom and pull/pry off.
- G. Endo-Scrub® 2 - power connector.
- H. Power cord connector: See appendix B for part numbers.
  - Hospital grade power cord connects here.
  - Means of disconnecting device from Mains voltage by the power cord.
- I. Equipotential:
  - Uniform potential.
  - Means for eliminating noise or interference with sensitive equipment by application of a POTENTIAL EQUALIZATION CONDUCTOR.

## Power Cords

North America: USA, Barbados, Belize, Bolivia, Canada, Columbia, Ecuador, Venezuela Standard P/N EA600 or 1895820 6 meter P/N EA650 or 189721	United Kingdom, Ireland, Hong Kong, Malaysia, Singapore P/N EA606 or 1895821	Continental Europe: Austria, Belgium, Finland, France, Germany, Greece, Korea, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden P/N EA602 or 1895822
China P/N EA604	India, South Africa P/N EA607	Switzerland P/N EA601
Argentina P/N EA608	Israel P/N EA609	Denmark P/N EA610
Australia, New Zealand P/N EA605	Japan P/N EA603 or 1895823	Italy, Chile P/N EA611

## Console Pump Designator



- A. Pump 1: Coolant, lens cleaning, or irrigation.
  - B. Pump 2: Irrigation or lens cleaning.
  - C. Pump 1 Designator – This designator number is used to coordinate the pump (by number) with the cartridge number and/or pump set-up screen number listed on the touch screen. When setting up the console these **numbers must match**.
  - D. Pump 2 Designator.
- NOTE: Not all Pump Cartridges have pump designator numbers. For these cartridges the operator should view the Pump Setup Screen prior to installing the cartridge.*

## Irrigation/Coolant Pumps

### Pump Cartridge Set-up

The Pump Cartridge snaps onto the lower section of the pump.



### Visao® Pump Cartridge

The Visao® Pump Cartridge has both a pump tube and a return tube.



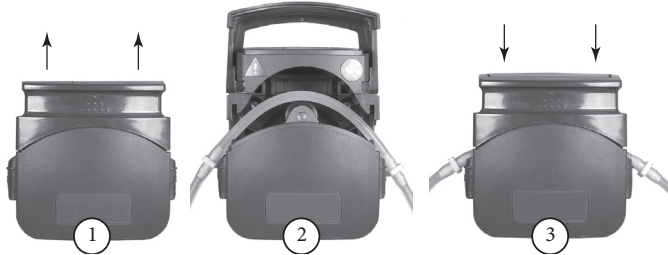
- A. Pump tubing.
- B. Pump tubing is clipped into the Pump Cartridge.
- C. Return tube.

## Visao® Coolant Pump Set-Up

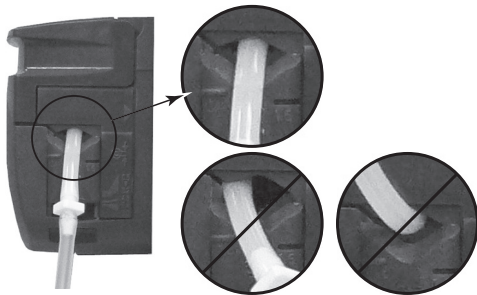
The Pump Cartridge snaps onto the lower section of pump # 1.



## Standard Pump Set-up



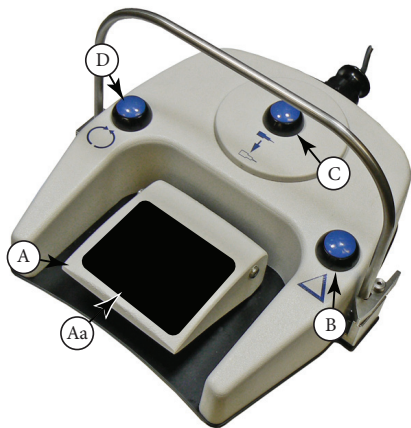
## Tips on loading the pump



## Accessories/attachments

### Multifunction Foot Control Unit (FCU)

Part No. 1898430 or EF200



#### Buttons and Pedal

*NOTE: Each button must be depressed and held for a definable amount of time (100 mS by default).*

#### Drills

- A. Foot Pedal - Start/Stop, Variable speed.
- Aa. Non-Slip Foot Pad.
- B. Right Button - Pedal function, (Start-Stop or Variable speed).
- C. Top Button - Active handpiece selection
- D. Left Button - Mode selection, (FWD/REV).

#### Microdebrider

- A. Pedal: Start/stop, variable speed (start/stop, or variable speed selectable via FCU button on Main Screen).
- B. Right Button: In OSC Mode this button will rotate inner blade 60°/180° (touchscreen selected). In FWD Mode this button will select Pedal function (Start/stop, or variable speed).
- C. Top Button: Active handpiece selection.
- D. Left Button: Mode/RPM selection -

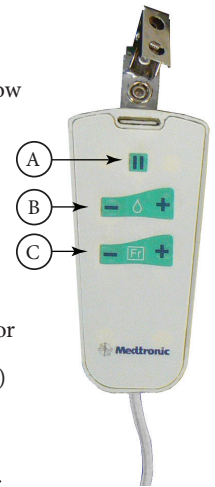
#### SC1

- A. Pedal: Start/stop, variable speed (start/stop, or variable speed selectable via FCU button on main screen).
- B. Right Button: If mode is set to OSC this button will, rotate inner tube on blades 180°. If mode is set to FWD this button will, select pedal function (Start/stop, or variable speed).
- C. Top Button: Active handpiece selection.
- D. Left Button: Mode selection -FWD/OSC

*NOTE: If any of these condition are different check your set-up, if still incorrect contact Customer Service.*

## Intelliflow Irrigation Remote Control

- A. Pause/On-Off:
  - Pause if used with handpiece irrigation (Flow rate will flash yellow).
  - On-Off/Pause if used with Suction Irrigator.
- B. Increase/Decrease:
  - Handpiece Irrigation - fine adjustment for irrigation rate.
  - Suction Irrigator - fine adjustment for irrigation rate.
- C. Increase/Decrease:
  - Handpiece Irrigation - coarse adjustment for irrigation rate.
  - Suction Irrigator - selects stainless steel (Fr) tubing size.



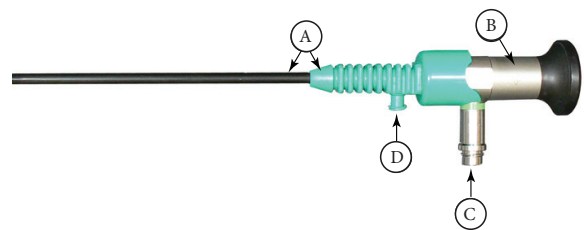
## Endo-Scrub® 2

*NOTE: Can be used only with a microdebrider.*

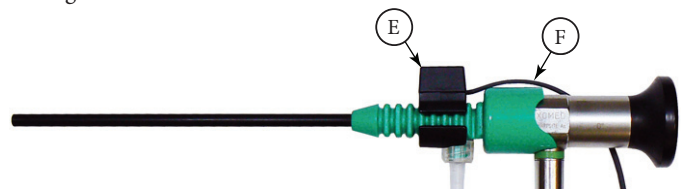
The IPC™ System incorporates Endo-Scrub® 2 functionality by using irrigation pump number one (1) and controlling operation with the touch screen and an external footswitch or finger switch.

It is not to be used for infusion, for disinfection or sterilization of an endoscope, or for suction removal of blood and debris.

*NOTE: Use the Endo-Scrub® 2 sheath only with an endoscope listed on the sheath product label, as malfunction or poor performance could result.*

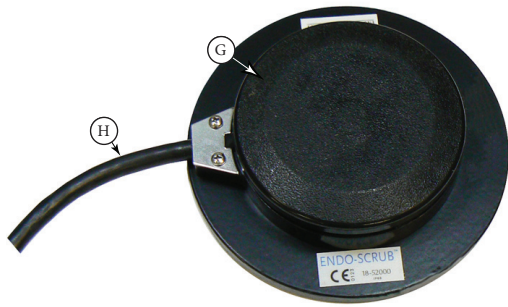


- A. Endo-Scrub® 2 Sheath.
- B. Endoscope.
- C. Light source connection.
- D. Irrigation connection.



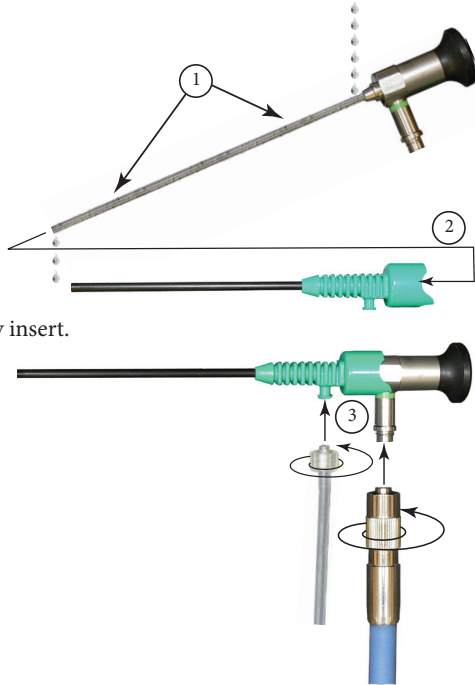
- E. Endo-Scrub® 2 Finger switch.
- F. Finger switch cable.





- G. Endo-Scrub® 2 Footswitch.
- H. Endo-Scrub® 2 Footswitch cable.

### Endo-Scrub® 2 Assembly



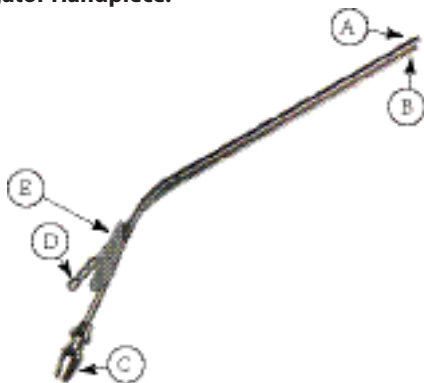
1. Wet.
2. Slowly insert.

3. Attach-irrigation and light source.

### Suction Irrigator

The Suction Irrigator may be selected via the radio button within the Irrigation Method box.  
**NOTE:** The suction irrigator is NOT available for microdebrider handpieces.

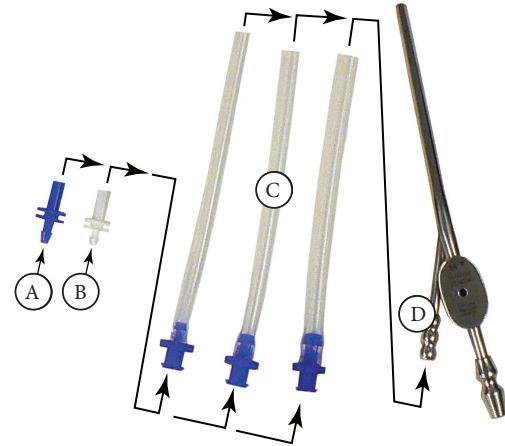
#### Suction Irrigator Handpiece.



- A. Suction Tube.
- B. Irrigation tube.
- C. Suction Fitting.
- D. Irrigation Fitting.
- E. Tube Size.

**NOTE:** The Suction Irrigator shown here is available for all drills provided a microdebrider is not attached to the console.

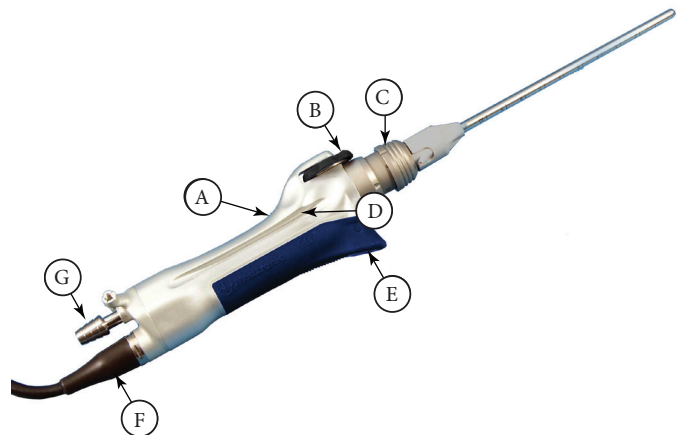
### Suction Irrigator Adapter Kit



- A. Blue Irrigation Tube Adapter fits high speed irrigation tubing - 3318503.
- B. White Irrigation Tube Adapter fits IPC™ Visao® irrigation tubing - 3318603.
- C. Irrigation Connector Set is used to adjust the Blue or White Adapter to the stainless steel Irrigation Fitting.
- D. Irrigation Fitting.

### Handpieces Microdebridors and SC1

#### StraightShot® M4, Microdebridors, and Midas Rex® SC1



- A. Handpiece.
- B. Finger wheel.
- C. Locking collar.
- D. Irrigation-tubing groove.
- E. Finger-wheel lock.
- F. Cable.
- G. Suction barb.

## Technical Specifications

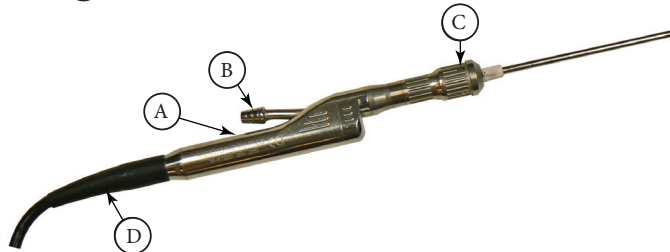
**StraightShot® M4 Microdebrider** Part No. 1898200T

**Midas Rex® SC1** Part No. ED100

Speed	50-5,000 RPM oscillate 50-12,000 RPM forward
Size	14.3 cm length x 1.8 cm width (1898200T)
Weight	228 g 1898200T 240 g 1897200 254 g 1897200T 240 g 1897201
Duty Cycle	The StraightShot®, M4, and SC1 Handpiece under full load are rated for intermittent operation per the following: Maximum On Time 60 seconds Minimum Off Time 30 seconds

*NOTE: If any of these condition are different check your set-up, if still incorrect contact Customer Service.*

## StraightShot® Magnum® II and StraightShot® III Microdebriders



- A. Basic handpiece
- B. Suction barb
- C. Locking collar
- D. Cable

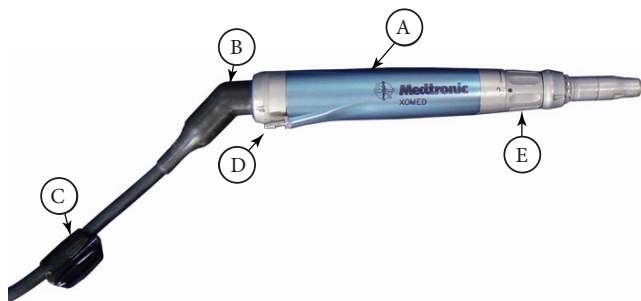
### Technical Specifications

Handpiece - StraightShot® Magnum® II, Part No. 1897200	
StraightShot® III Part No. 1897201	
Size	17 cm length x 1.6 cm diameter (1897200)
Speed	50-5,000 RPM oscillate 50-12,000 RPM forward
Size	17 cm length x 1.6 cm diameter
Weight	240 g
Duty Cycle	Under full load are rated for intermittent operation per the following: Maximum On Time 60 seconds Minimum Off Time 30 seconds

## Handpieces Drills

*Caution: do not use Xcalibur or Powerforma handpieces with the IPC™ console.*

## Visao® High-Speed Otologic Drill (Water-Cooled)



- A. Handpiece

- B. Cable
- C. Cable clip
- D. Cooling barbs
- E. Locking collar

### Technical Specifications

**Visao® High-Speed Otologic Drill** Part No. 3334800

Speed	200-80,000 RPM forward/reverse, Water-Cooled
Size	16.0 cm length x 2.0 cm diameter
Weight	148 g
Duty Cycle	The Visao® High-Speed Otologic Drills under full load are rated for intermittent operation per the following: Maximum On Time: 60 seconds Minimum Off Time: 30 seconds

## Skeeter® Ultra-Lite Oto-Tool System Set-Up and Use



- A. Tool
- B. Tool's color code.
- C. Tool lock/release button.
- D. Cannulated shaft.
- E. PTFE Bearing.

### Technical Specifications

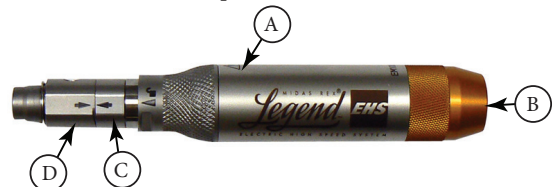
Part No.	3055601
Speed	1,000-16,000 RPM forward/reverse
Size	17 cm length x 1.6 cm diameter
Weight	57 g
Duty Cycle	Continuous run

### Storage

Temperature:	-40°C to +70°C
Humidity:	10% to 100% RH
Barometric Pressure:	500 to 1060 hPa

## Midas Rex® Legend EHS® Motor

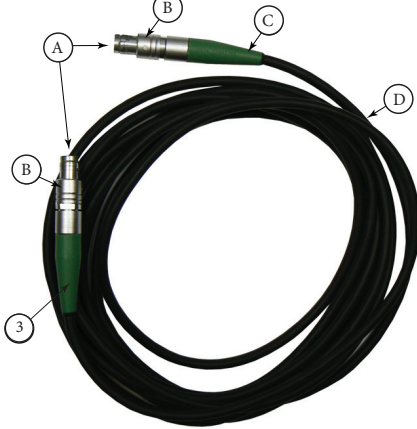
High speed, high torque, reversible electric motor used to dissect bone and biomaterial at selectable speeds from 200 to 75,000 RPM.



- A. Midas Rex® Legend EHS® Motor.
- B. 4-pin cable connection.
- C. Rotational collet.
- D. Stationary collet.

## Legend EHS® Motor Cable

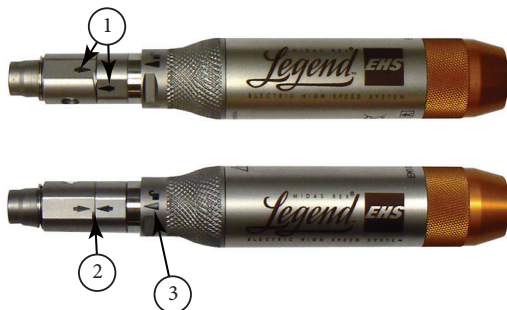
Connects the motor to the console.



- A. 4-pin connector.
- B. Locking sleeve.
- C. Green boot.
- D. Cable.

### Motor Collet

Prior to installing an attachment, ensure that arrows on the motor collet are in proper alignment.



1. Improperly aligned collets.
2. Properly aligned collets.
3. Motor side attachment alignment arrow.



If the arrows are not aligned, use the Motor Wrench to turn the rotational collet until its arrow is aligned with the arrow on the stationary collet.

### Technical Specifications

Part No.	EM100-A
Speed	200-75000 RPM forward/reverse
Size	9.02 cm length x 2.03 cm diameter
Weight	180 g

#### Duty Cycle (To avoid overheating):

- For continuous use in operating room temperatures up to 40°C, the Legend EHS® Motor is rated for a cutting time of 3 minutes, at 70,000 RPM.
- For normal operating room temperatures (typically 20°C) the Legend EHS® Motor is rated for a continuous cutting time of 10 minutes followed by 25 minutes of rest.
- The Legend EHS® Motor is rated for intermittent use of 20 seconds ON / 20 seconds OFF, indefinitely at 70,000 RPM.

## Midas Rex® Legend EHS Stylus® Motor

A smaller compact high speed, high torque, reversible electric motor used to dissect bone and biomaterials at selectable speeds from 200 to 75,000 RPM. The Midas Rex® Legend EHS Stylus® Motor cable is integral with the Handpiece and is not removable from the motor.



- A. Midas Rex® Legend EHS Stylus® Motor.
- B. Cable.
- C. Rotational collet.
- D. Stationary collet.
- E. Ground connector.
- F. 4-pin connect
- G. Locking sleeve.
- H. Black boot.

### Technical Specifications

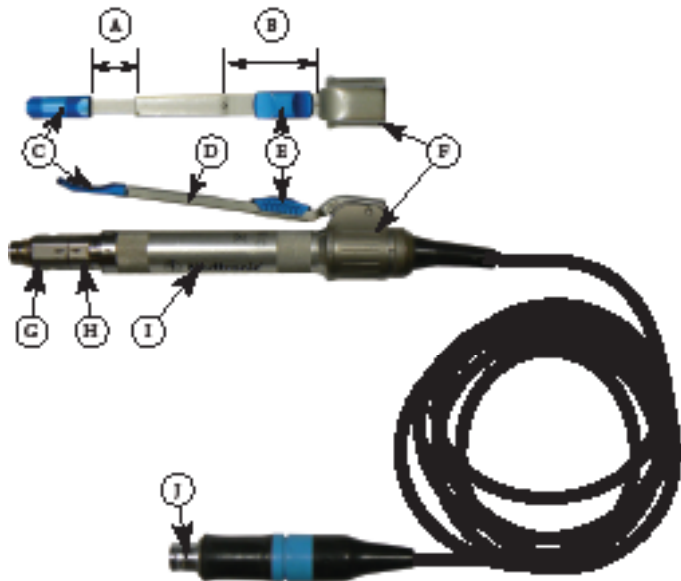
#### Legend EHS Stylus® Motor

Part No.	EM200
Speed	200-75000 RPM forward/reverse
Size	7.77 cm length x 1.65 cm diameter
Weight	90 g

#### Duty Cycle (To avoid overheating):

- For continuous use in operating room temperatures up to 40°C, the Legend Stylus™ Motor is rated for 3 minutes at 60,000 RPM, followed by 25 minutes of rest.
- For normal operating room temperatures (typically 20°C) the Legend Stylus™ Motor is rated for continuous cutting indefinitely at 60,000 RPM.

## Midas Rex® Legend EHS® Stylus Touch™ Motor



- A. Range of motion
- B. Range of motion
- C. Telescoping Finger Rest (pull out/push in).
- D. Finger Lever
- E. Finger Lever Safe Mode Switch
- F. Control Lever Ring
- G. Stationary Collet
- H. Rotational Collet
- I. Midas Rex® Legend EHS® Stylus Motor
- J. 12-pin Connector and Boot

### To Rotate the Finger Lever



1. Firmly push the “Control Lever Ring” forward and rotate slightly in a clockwise or counter-clockwise direction as shown in figure.
2. Continue rotating the finger lever until lever locks in new position.

### Technical Specifications

Legend EHS® Stylus Touch™ Part No. EM210

Speed: 75,000 rpm forward/reverse

Size: 15.26 cm length x 1.65 cm diameter

Weight 130 g

Duty Cycle (To avoid overheating):

- For continuous use in operating room temperatures up to 40°C, the Legend EHS® Stylus Motor is rated for 3 minutes at 60,000 rpm, followed by 25 minutes of rest.
- For normal operating room temperatures (typically 20°C) the Legend EHS® Stylus Motor is rated for continuous cutting indefinitely at 60,000 rpm.

## Splash Screen

The Splash Screen is displayed while the system is starting up and executing its self tests.



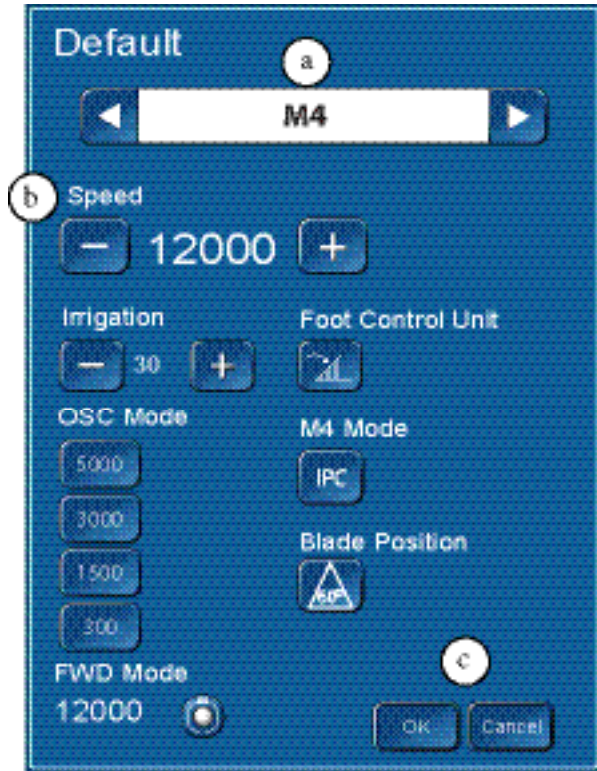
## Settings Screen

During the boot up/self-test operation the Splash Screen will display the Setting button for about 5 seconds. To change language, default settings, or calibrate the touch screen you must depress this button while it is displayed.



- A. This area is used to select desired language.

- B. "Touch Screen Calibration" button will open the calibration screen. To calibrate follow the on screen instructions
- C. The "Default" button will open the default screens.



- a. The operator can cycle through handpieces to locate desired handpiece.
  - b. The operator may change any of the default settings to those most frequently used or view default settings.
  - c. OK or Cancel button will accept or void changes and return to previous screen.
- D. OK or Cancel button will accept or void changes and return to previous screen.

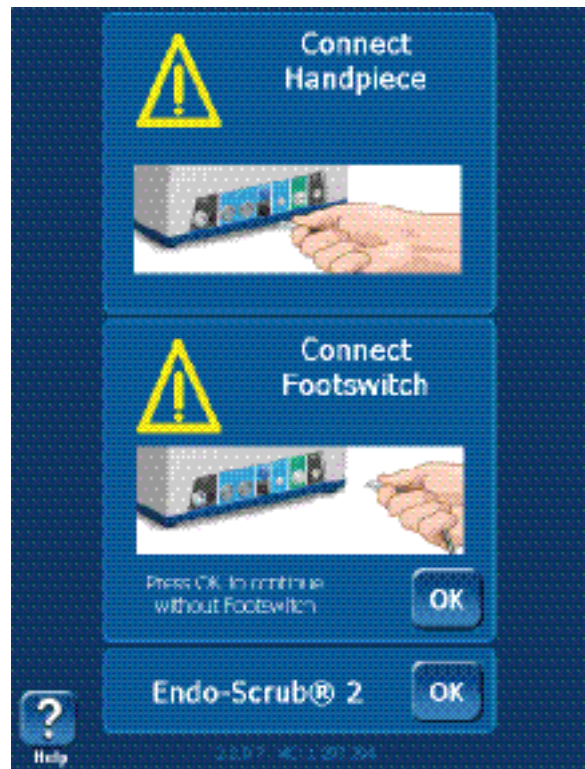
*NOTE: Changing the default setting of any handpiece in no way affects the operator's ability to change settings during surgery.*

## Handpiece Default Settings Table

Handpiece	Speed Setting	Mode		Pumps	
		Fwd	Osc	Pump 1	Pump 2
Visao®	80000	X		Coolant	Irrigant
Midas Rex® SC1	3400		X		Irrigant
StraightShot® M4,	12000	X		Endo-Scrub® 2	Irrigant
StraightShot® III, Magnum® II	5000		X	Endo-Scrub® 2	Irrigant
Midas Rex® Legend EHS® motor.	70000	X		Irrigant	
Midas Rex® Legend EHS® Stylus motor	60000	X			Irrigant
Midas Rex® Legend EHS® Stylus Touch™	60000	X		Irrigant	
Skeeter® Handpiece	16000	X			
Endo-Scrub® 2				X	
Suction Irrigator				Optional	Optional

Device	Setting
FCU Delay	100 mS
Endo-Scrub® 2 Pump	Pump 1
Endo-Scrub® 2 Setting	3

## Connect Handpiece/Footswitch Screen



When the IPC® detects no handpiece the Connect Handpiece screen will open.

By pressing the OK button in the Connect Footswitch panel the handpiece function will be allowed without the use of a footswitch.

By pressing the OK button in the Endo-Scrub® 2 panel the Endo-Scrub® 2 function will be allowed without the use of a hand piece.

## Console Set-Up

### Console Set-Up Instructions

General instructions: for set-up and use of the Integrated Power Console. See "Accessories" for instructions specific to the peripheral being used.

*NOTE: Use sterile water or saline for irrigation and cooling.*

1. Locate cart and lock wheels.
2. Inspect components for damage and determine if system is ready to use.
3. On IV pole, mount IPC® and irrigation/coolant bag(s).  
*NOTE: Irrigant and coolant bags should be placed above the console to ensure adequate flow.*
4. Position the IPC® in a manner that does not obstruct the power inlet for the purpose of disconnecting the Mains voltage by the power cord. Plug unit into power source.
5. Connect footswitch.
6. Connect the sterilized accessories to console.
7. Tubing
  - Connect tubing as needed (suction, cooling, irrigation).
8. Turn power switch ON and verify:
  - System passes self test
  - Default screen opens. If "Attach Handpiece / Attach Footpedal" screen opens, return to steps 4 and 5.
9. Prime irrigation and cooling: See Precaution P1.
  - a. Adjust clamp on the irrigation tubing to OPEN.
  - b. Manually prime the clear drip chamber (if used).
  - c. Depress and release the prime button on the touch screen panel. Verify:
    - Pump(s) run until all air has been purged out of the tubing.

- A small amount of irrigant is observed flowing at the tip of irrigation device(s).
  - Pump(s) turns off.
10. Confirm system operation.  
Verify:
- Pedal (Coolant) Starts handpiece and coolant flow (coolant pump continues to run for 1 minute after pedal is released).
  - Pedal (Irrigation) Starts and stops the handpiece and irrigation flow (At this step you should also verify that the characters on the SPEED display changed from white to yellow).
  - Pedal Buttons: Please refer to “Multifunction Foot Control Unit”.
11. Depress the intraoperative button on the back of the console.  
Verify:
- Starts and stops the handpiece, irrigation and/or coolant flow.
12. Touch Screen  
Verify:
- Speed can be adjusted.
  - Mode can be changed.
  - In oscillate and cut modes check:
    - The “Blade Position” panel opens.
    - The clockwise and counterclockwise buttons move the position indicator and blade in the appropriate direction.



- Depressing the 180° button moves the position indicator and blade 180°.
- Flow rate for irrigation is adjustable.

## Power Down

1. Turn power switch Off.
2. Disconnect:
  - a. Accessories.
  - b. Suction, irrigation, and coolant tubing.
  - c. Power cord.
3. Discard disposables following health-care facility guidelines on contaminated materials.

*NOTE: If any of these condition are different check your set-up, if still incorrect contact Customer Service.*

## Cleaning

### IPC™, Foot Control Unit, and Endo-Scrub® 2 Footswitch

- Do not immerse or sterilize the units.
  - Do not use alcohol, other solvents, or abrasive cleaners.
1. Wipe down the IPC™, Foot Control Unit, and Endo-Scrub® 2 Footswitch with a cloth dampened with a neutral enzymatic detergent, pH 6.0-8.0 or phenol based disinfectant.

### Non-Slip Pad ONLY

- 1a. Spray a neutral enzymatic detergent, pH 6.0 – 8.0, or a phenol based disinfectant, mixed to manufactures instructions, directly onto foot pad.
  - 1b. Allow the solution to remain in contact with the surface for approximately 10 minutes.
  - 1c. Wipe the solution or disinfectant off the foot pedal until visually clean.
2. Dry the units with a clean, non-abrasive cloth.

*NOTE: If debris is found under the Foot Control Unit’s boot, return for warranty service.*

## Console Specifications

Functional Standards for Electric Systems		
ANSI / AAMI: - ES 60601-1	Medical electrical equipment -- Part 1: General requirements for basic safety and essential performance	2005
IEC - 60601-1	Medical electrical equipment -- Part 1: General requirements for basic safety and essential performance	2005
EN - 60601-1	Medical electrical equipment -- Part 1: General requirements for basic safety and essential performance (IEC 60601-1:2005)	2006
IEC - 60601-1-4	Medical Electrical Equipment – Part 1: General Requirements for Safety, Part 4: Programmable Electrical Medical Systems	2000
EN - 60601-1-2	Medical Electrical Equipment – Part 1-2: General Requirements for Safety – Collateral Standard: Electromagnetic Compatibility – Requirements and Tests	2001/ A1: 2006
CSA - C22.2 No. 601.1	Medical Electrical Equipment - Part 1: General Requirements for Safety.	2005

### Physical Dimensions

Size: 277 mm W x 353 mm H x 267 mm D  
Weight: 7.3 kg

### Operational Environment

Temperature: +10°C to +33°C  
Humidity: 30% to 75% RH  
Barometric Pressure: 700 - 1060 hPa

### Transport and Storage Environment

Temperature: -40°C to +70°C  
Humidity: 10% to 95% RH  
Barometric Pressure: 500 to 1060 hPa

### Display / Touch Screen

Type: High contrast, digital, graphic Color, visible in complete darkness.  
Resolution: Display 21 cm diagonal, resolution 480 X 640 pixels

**Audio Output**

Baseline Audio Sound Level 60 dBA minimum SPL (1 m)

**Electrical**

Input Voltage	100 V-240 V ± 10%
Frequency	50/60 Hz
Power Consumption:	500 VA
Auxiliary AC output:	200 VA Max.
Internal Fuse	5 x 20 mm T. L. 5 A, 250 V Medtronic Xomed P/N 11270066

**Duty Cycle for Applied Part** Maximum on Time 120 Seconds  
Minimum off Time 180 Seconds

**Protectively Earthed Exposed Metal**

Applicable components: Equalization Terminal (PN 11190620) and Components in direct contact with the Back Panel (PN 11683316).

Applicable test: 25 Ampere/60Hz ground bond for 5 seconds, (per IEC 60601-1 Clause 8.6.4.a)

Applicable result: <100 milli-Ohm impedance

**Floating Metal**

Applicable components: Pole Clamp (PN 66320173) and bezel of irrigation port in Connector Panel (PN 44681784 or PN 11249350)

Applicable test: 4000VAC high potential, 60Hz, 60 seconds, 10 second ramp-up (per IEC 60601-1 Clause 8.8.3)

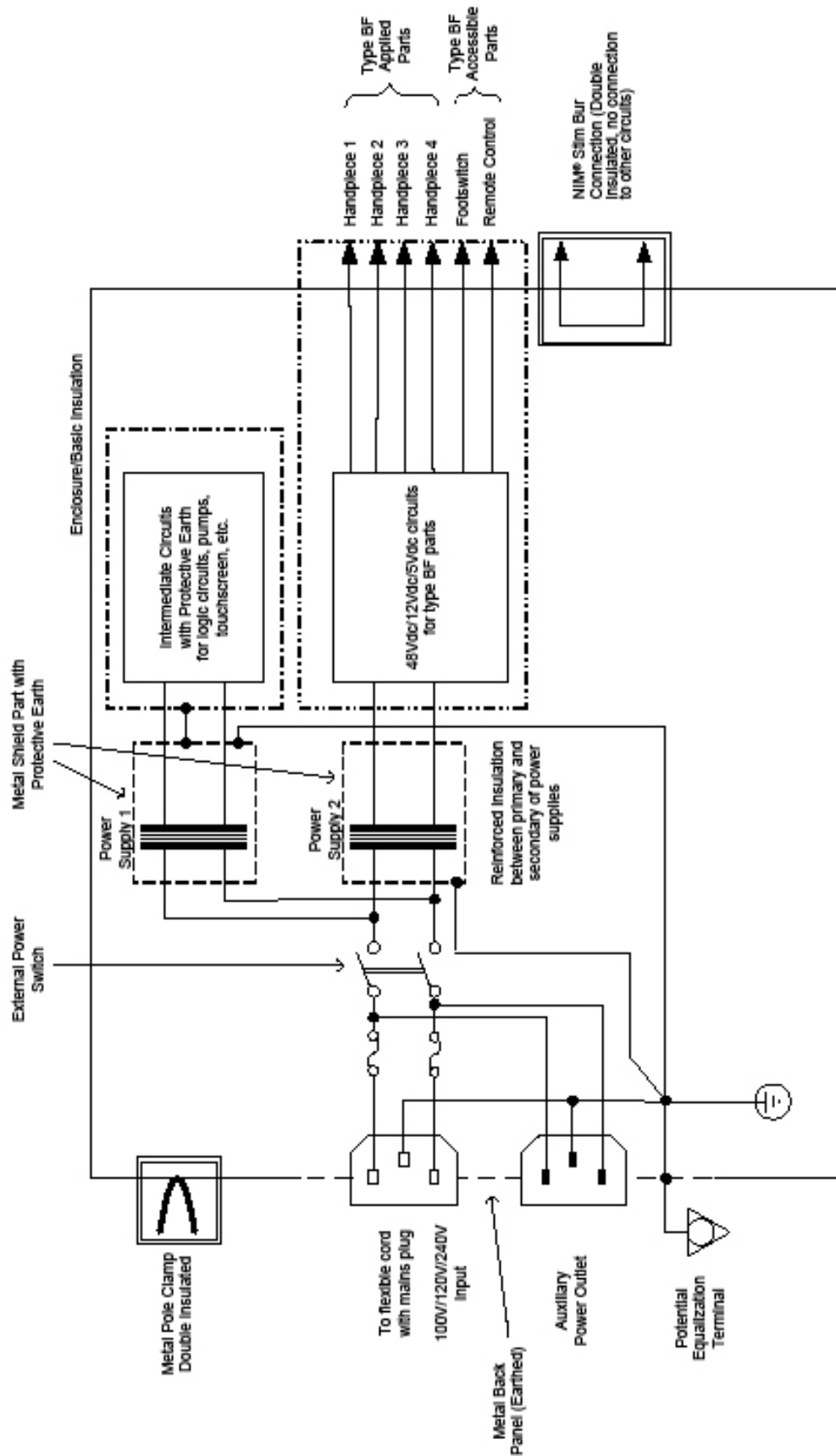
Applicable result: <10mA leakage

**Metal Shells of Type BF Electrical Connectors**

Applicable components: Shells of footswitch, 12-position handpiece, and 4-position handpiece connectors of Connector Panel (PN 44681784 or PN 11249350)

Applicable test: 2500VAC high potential, 60Hz, 60 seconds, 10 second ramp-up (per IEC 60601-1 Clause 8.8.3)

Applicable result: <10mA leakage



IPC™ Block Diagram

**Protective Earthing:**

1. No protection devices specified in Section 14.2.4 of JIS T 1001 are used.

**Accessible Parts:**

Metal Pole Clamp has no conductive connection to other parts of console

**Separation from commercial power source:**

1. For separation from commercial power source, the system shall be simultaneously disconnected from all the poles using a flexible cord with external mains plug.
2. Power Switch is not installed in power cord.
3. Each phase conductor is equipped with overcurrent fuse.



# Troubleshooting

## IPC® and Foot Control Unit

Symptom	Issue	Action
Pumps don't run.	Failed internal components.	Contact Customer Care.
	Moisture ingress in cable conflicts with handpiece recognition.	Run a dry cycle when sterilizing, If problem persists, contact Customer Care.
Little or no irrigation flow.	Tubing Set improperly seated in pump.	Reposition tubing in pump, verify pump lid is fully closed with the fluid flow from left to right.
	Tubing is pinched or kinked.	Check tubing at side of pump, see Irrigation/Coolant Pumps Check remaining tubing for pinched or kinked areas, if necessary replace tubing.
	Tubing clamps are restricting flow.	Set tubing clamps in "open" position.
	Irrigation flow rate setting low.	Adjust irrigation flow rate
	Irrigator obstructed.	Replace irrigator
Pump stall error.	Tubing Set improperly seated in pump.	Reposition tubing in pump, verify pump lid is fully closed with the fluid flow from left to right. If problem persists, contact Customer Care.
	Tubing is pinched or kinked.	Check tubing is not pinched or kinked on side of pump (see section on "Irrigation/Coolant Pumps"). If problem persists, contact Customer Care.
Console default parameters incorrect.		
Handpiece connected but console reads "Connect Handpiece"	Moisture ingress in cable conflicts with handpiece recognition.	Run a dry cycle when sterilizing, If problem persists, contact Customer Care.
Handpiece connected but console displays incorrect handpiece.		
Console doesn't power up.	Power cord not properly connected.	Connect power cord.
	No power.	Check power available (i.e. power strip is on, circuit breaker is closed etc.)
	Power Inlet Fuses blown.	Replace fuses with 5.00 A, 250V, time delayed fuses (P/N 11270066)
	Failed internal components.	Contact Customer Care.
Power switch light is on but Touch Screen doesn't come on.	Failed internal components.	Contact Customer Care.
Console doesn't power down.	Power switch failure.	Unplug power cord, contact Customer Care.
Touch Screen doesn't respond.	Screen gasket displaced or failed internal components.	Contact Customer Care.
Touch Screen doesn't work properly.	Touch Screen not calibrated.	Calibrate Touch Screen. If problem persists, contact Customer Care.
Console displays wrong handpiece / motor type.	Console misidentified the handpiece / motor.	Disconnect and reconnect the motor cable.
		Turn console off then on.
		Change motor, motor cable, or console to isolate the problem.
	Moisture ingress in cable conflicts with handpiece recognition.	Run a dry cycle when sterilizing, if problem persists, contact Customer Care.
Foot control unit buttons or pedal doesn't respond.	Incorrect use.	Press and hold buttons for at least 1 second, wait for console confirmation beep.
	Top button doesn't respond.	One (1) handpiece connected (top button has no function with 1 handpiece connected).
	Connector not fully inserted.	Disconnect and reconnect the fcu cable connector.
		Try different fcu or console to isolate the problem.
	Internal component failure.	Contact Customer Care.
Handpiece fails to rotate	Failed footswitch.	Disconnect footswitch, use manual start/stop rocker switch on rear of console.
	Failed handpiece motor or motor driver.	Contact Customer Care.

<b>Non EHS Blades or Burs</b>		
<b>Symptom</b>	<b>Issue</b>	<b>Action</b>
Appears to be damaged or defective.	Damaged or defective.	Remove and replace.
Tool Vibrates Excessively, Abnormal Noise movement.	Tool is not firmly seated.	Microdebriders, pull back locking collet and re-seat the tool. Visao®, unlock collar, check/re-seat notch, lock collar.
No suction.	Blade opening is obstructed.	Use stylet to clear blade. Remove blade from surgical site and submerge the blade tip in sterile water with suction connected to the handpiece to evacuate the obstruction.
	Tubing obstructed.	Remove and inspect suction tubing, and if obstructed, remove obstruction, reconnect tubing.
Tool is leaking irrigant.	Tool not seated correctly in collet.	Check for proper tool insertion by pulling back locking collet, and re-seating tool.
	Low or no suction.	See SYMPTOM, no suction.
Tool wobble in Handpiece.	Tool wobbles in Handpiece.	Reduce handpiece operating speeds.
		Use tools that are rated for the console speed selected
		If necessary, use bur guard with burs medium, long and X-long.
		Operate handpiece at 50% of full speed for medium, long and X-long burs.
		Select a new tool. Contact Customer Care.

<b>Midas Rex® Legend EHS® motors</b>		
<b>Symptom</b>	<b>Issue</b>	<b>Action</b>
Motor is too hot to touch/hold	Inadequate cool down period following sterilization.	Motor must be allowed to cool down following steam sterilization.
	Attachment transferring heat to the motor.	Switch attachments to determine whether the heat is being generated by the motor or the attachment. Contact Customer Care.
	Heavy side loading during dissection.	Discontinue use and rest the motor by using it intermittently or wrap the motor with a moist sterile towel. If overheating continues, contact Customer Care.
	Inadequate irrigation.	Ensure adequate irrigation to surgical site during bone dissection.
Tool is difficult to remove from attachment	Aging of attachment	Contact Customer Care.
	Use of reprocessed tools	
	Use of an unauthorized refurbisher	
Attachment will not seat properly on the motor	Improper cleaning	Clean the attachment thoroughly according to the instructions in this manual. Change tool.
	Motor collet flats are not aligned.	Use the Legend motor wrench to rotate the flat closest to the motor case until its marker is aligned with the marker on the flat farthest away from the motor case.
Motor does not run.	Cables not properly connected.	Ensure motor and foot control cables are properly connected.
	Speed setting is too low.	Ensure that a speed greater than 10,000 rpm (EHS) or 3,000 rpm (Stylus) is selected.
	Attachment not properly installed and locked onto the motor.	Remove and reinstall the attachment and dissecting tool to ensure proper installation.
	Internal failure of motor and/or console.	Change motor or console to isolate the problem. Contact Customer Care.
	Foot control not properly functioning.	Check for obstruction under the foot pedal. If problem persists, contact Customer Care.
	Cables damaged	Check cables for cracks, splits, or bent connector pins.
Motor with attachment rotates, but an abnormal noise is heard	Bearings are worn.	Change the attachment to isolate the location of the problem. Contact Customer Care.
	Poor electrical Connection	Check all connections from electrical source to console. Ensure motor and foot control cables are properly connected.
	Internal failure of motor, console, or cable.	Change motor, console, or cable to isolate the failing component. Contact Customer Care.
	Attachment not properly installed	Remove and reinstall the attachment and dissecting tool

<b>Midas Rex® Legend EHS® Stylus Touch™ motors</b>		
<b>Symptom</b>	<b>Issue</b>	<b>Action</b>
Motor does not run.	Finger switch not reaching maximum speed	Check that the control lever ring is properly seated in one of the four possible positions.
	Finger switch not responding. Safety switch in safe mode	Place switch in run mode.
	Finger control damaged.	Contact Customer Service.

## Midas Rex® Legend EHS® Attachments or Telescoping Tubes

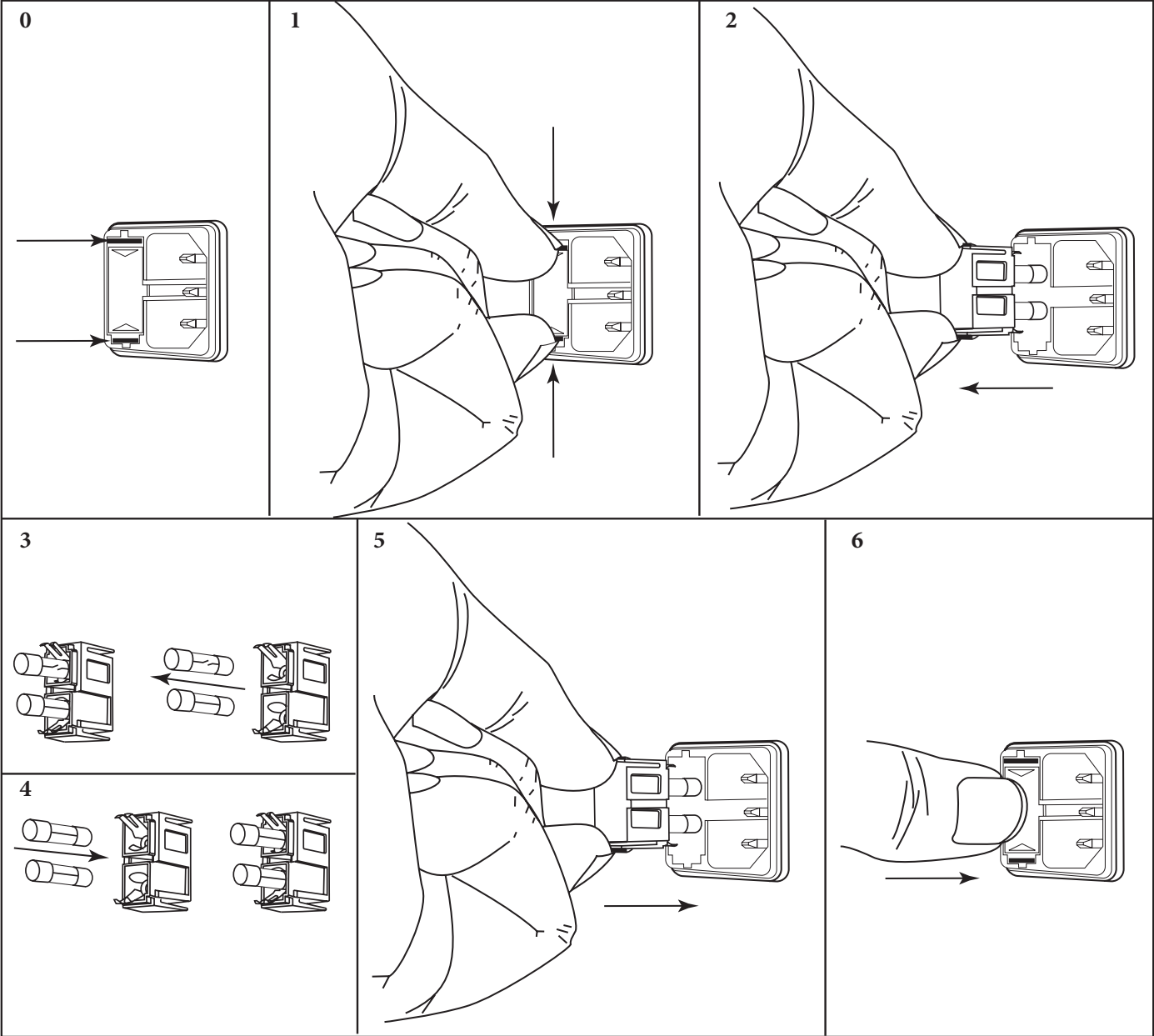
Symptom	Issue	Action
Attachment or Telescoping Tube has uncomfortable temperature to touch/hold	Heat from worn attachment/tube bearings	DO NOT use. Try another attachment/tube. Contact Customer Care. Telescoping Tubes are multi-use disposable. If problem is resolved with a new Telescoping Tube, discard the over-heated tube.
	Attachment/tube unclean due to improper cleaning procedures	Check that appropriate cleaning procedures are being followed.
	Heavy side loading during dissection	Discontinue use and rest the attachment by using intermittently, try another identical attachment or wrap the attachment interface with a moist sterile towel. If attachment continues to overheat, Contact Customer Care.
Attachment/telescoping tube is bent, loose, damaged or missing a component	Attachment mishandled, failed due to extended use or excessive force applied during use	DO NOT use. Contact Customer Care.
		Dispose of telescoping tube. Telescoping Tubes are multi-use disposable.
Color band on Attachment/ Telescoping Tube fades or discolors	Incorrect cleaning or sterilization method	Use nomenclature markings on the attachment to match with a corresponding dissecting tool or Contact Customer Care.
	Use of chlorine based or corrosive agents	
	Aging	Telescoping Tubes are multi-use disposable.
Attachment has excess lubrication	Over lubrication during cleaning process	Visually inspect and wipe excess lubrication.
Footed attachment has a component missing from leg/foot area or foot is bent	Attachment damaged by dissecting tool drilling out part or all of leg/foot area.	DO NOT use. Contact Customer Care.
	Bend caused by incorrect use.	
16-Mf contra-angle attachment is overheating	The contra-angle attachment operates by a set of internal gears to engage the drive shaft. It is normal for some heat to be generated approximately 2 cm from the distal end of the attachment and at the right of the angle head.	If heat continues or is excessive, contact Customer Care.
Smoke is generated by the attachment or motor	Attachment is not in the locked position.	Make sure the attachment is in the locked position.

## Midas Rex® Legend EHS® Tools

Symptom	Issue	Action
Tool fails	A non-Legend tool is being used.	Replace with a Legend tool.
	Worn attachment or tube bearings.	Try another attachment or tube to isolate the location of the problem.
		If the attachment is failing, contact Customer Care.
		If the tube is failing, dispose of it and use a new tube.
	Attachment/tube and tool are not compatible.	Match color code on the tool packaging to the color code on the attachment/tube.
	Motor is damaged.	Contact Customer Care.
Tool's size and geometry may contribute to flailing at certain speeds.	Adjust the speed by changing the pressure setting or foot/finger control. Do not use if flailing persists. Change tool.	
Tool vibrates excessively	Tool's size and geometry may create excessive vibration at certain speeds.	Adjust the speed.
		Change tools.
Tool dull	Extended use	Change to a new tool
	Reprocessed tool was used	Contact Customer Care.
	Incorrect geometry	
Tool will not seat properly in the motor or attachment collet	Debris in collet of attachment or motor.	Clean the attachment or motor thoroughly according to the instructions in this manual.
	A non-Legend tool is being used.	If cleaning does not correct the problem, contact Customer Care. Replace with a Legend tool.

<b>Error Code</b>			
<b>Error Code</b>	<b>Cause</b>	<b>Error Message Title</b>	<b>Error Message Description</b>
1	MCB does not report that it is booted within 5 seconds of AI telling it to start and subsequent reattempts fail.	System Error	Power off. Wait 10 seconds. Power on. If error persists, call Technical Services.
2	Not Used	N/A	N/A
3	UI-MCB Com Failure - Max resends exceeded	System Error	Power off. Wait 10 seconds. Power on. If error persists, call Technical Services.
4	UI-MCB Com Failure - Get answer failed		
5	UI-MCB Com Failure - No status message received		
6	UI-MCB Com Failure - Serialization ID error		
7	UI-MCB Com Failure - Timeout exception		
8	Not Used	N/A	N/A
9	Pump 1 stalled (no transitions on opto sensor)	Pump #1 Stalled	Check tubing connection.
10	Pump 2 stalled (no transitions on opto sensor)	Pump #2 Stalled	
11	Unrecognized/damaged handpiece plugged in on port 1 (first 12 pin)	Handpiece	Unplug handpiece and plug back in. If error persists, replace handpiece.
12	Unrecognized/damaged handpiece plugged in on port 2 (second 12 pin)		
13	Unrecognized/damaged handpiece plugged in on port 3 (4 pin)		
14	Unrecognized/damaged handpiece plugged in on port 4 (Skeeter)		
15	Handpiece Stalled	Handpiece Stalled	Check accessory.
16	MCB motor overcurrent detected	Motor Overcurrent	Unplug handpiece and plug back in. If error persists, replace handpiece.
17	Unrecognized/damaged FCU plugged in	Foot Control Connection Error	Unplug Foot Control and plug back in. If error persists, replace Foot Control or switch to manual control.
18	Damaged handpiece or finger lever base out of position.	Finger Control Error	A finger control error has been detected. Check that the control lever ring is properly seated in one of the four possible positions. If error persists contact Medtronic support. Press OK to use alternate control method.
19	UI self test failure - culture (language) registry entry	Self Test Failed	Power off. Wait 10 seconds. Power on. If error persists, call Technical Services.
20	UI self test failure - sector configuration registry entry		
21	UI self test failure - corrupt usage data file or unable to create usage data file		
22	Not Used	N/A	N/A
23	MCB non-specific self test failure	Self Test Failed	Power off. Wait 10 seconds. Power on. If error persists, call Technical Services.
24	MCB self test failure - Port 1		
25	MCB self test failure - Port 2		
26	MCB self test failure - Port 3		
27	MCB self test failure - Port 4		
28	MCB self test failure - bridge transistor 1 shorted		
29	MCB self test failure - bridge transistor 2 shorted		
30	MCB self test failure - bridge transistor 3 shorted		
31	MCB self test failure - bridge transistor 4 shorted		
32	MCB self test failure - bridge transistor 5 shorted		
33	MCB self test failure - bridge transistor 6 shorted		
34	MCB self test failure - A/D converter		
35	MCB self test failure - motor error		
36	MCB self test failure - 3.3 volt supply		
37	MCB self test failure - 12 volt supply		
38	MCB self test failure - 48 volt supply		
39	MCB self test failure - FCU port		

# Changing the Fuse





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